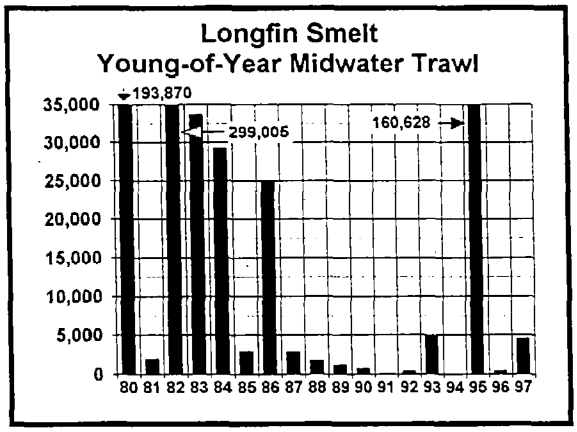
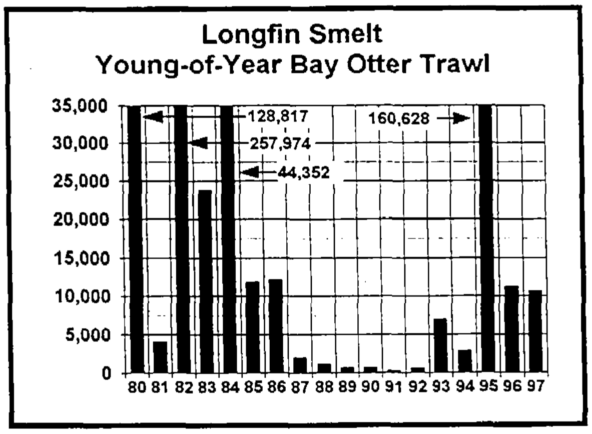
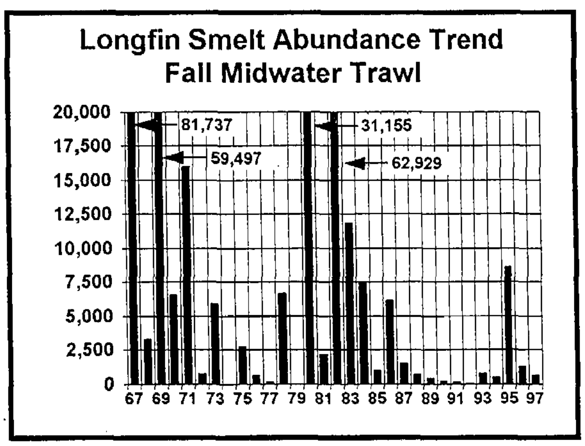




Longfin smelt abundance has been monitored by DFG in the Bay and Delta each fall since_1967. Population rates have fluctuated sharply, with greatest abundance in wetter years in wet-year sequences (1967, 1969, and 1971 from 1967- 1971; and 1980, 1982, and 1983 from 1980-1983). Abundance has been very poor in drought periods (1976-1977 and 1987-1992). Low abundance in 1993, the first wet year following the drought from 1987 to 1992, may reflect a greatly reduced spawning population resulting from drought conditions. Improved abundance in 1995 indicates that they may be recovering from the effects of the drought.

A similar pattern of population abundance is evident since 1980 in DFG's Bay trawling survey and the University of California, Davis' trawl survey in Suisun Marsh. Abundance was high from 1980 through 1984, but declined to very low levels through the 1987-1992 drought and has recovered only slightly since 1995.

The decline in the longfin smelt population has



coincided with a number of changes in the estuary. Related stressors believed to contribute to this decline are listed below.

Low flows in late winter and spring into and through the Delta may reduce survival of eggs and larval longfin smelt spawned in the Delta. Low Delta outflow limits transport of larval and juvenile longfin smelt downstream into quality nursery grounds of Suisun and San Pablo Bays. Low flows are a consequence of climatic conditions (low rainfall and more precipitation as winter rains rather than snow) and upstream reservoir storage of winter and spring runoff in dry and normal years.

Reduced freshwater flows through the Delta and into Suisun Bay may limit production of foodweb organisms during the critical early life stages of longfin smelt. Poor recruitment in drier years reduces the number of adults two years later, thus reducing the future spawning run. Water exports from the Delta during drier years entrain both prespawning adults and planktonic larvae, further reducing their population size. Such entrainment is greatly reduced or absent in wetter years.

The number of adults making the upstream spawning run has dropped to such low levels in recent years that they no longer produce sufficient numbers of eggs to bring about quick recovery in wet years. This may explain why production in 1993 was lower than expected.

Water diversion practices, especially in drier years, reduce larvae (about 5-15 millimeters long) and adult populations and lower reproduction rates. In drier years, the percentage of freshwater diverted is sharply higher than in wetter years.

In dry years, many larval and juvenile longfin smelt rearing in the Delta are drawn south across the Delta toward the south Delta pumping plants by the net southward flow caused by water exports at the pumping plants. Many probably perish before reaching the pumps as a result of poor food supply, poor water quality (mainly high water temperature), and predation in the central and south Delta channels, and intake forebays and structures of the pumping plants. Of those reaching the pumping plants, some are recovered in fish salvage facilities and returned to the Bay, while others are lost in exported water.

Power plants at Pittsburg and Antioch with the largest diversions (up to 3,000 cubic feet per second) operate in the prime nursery area of the western Delta and Suisun Bay. The power plants operate longer in winter and spring of dry years (when less hydroelectric power is produced) to meet regional electricity demands.

Similarly, Delta agricultural diversions are generally confined to late spring through fall; however, spring diversions are generally greater in drier years, when irrigation needs are higher. Although larvae losses to south Delta Central Valley Project and State Water Project pumping plants are generally much lower than losses to more northern and western Delta diversions, they are higher in drier years when Delta outflow is insufficient to move larval longfin smelt out of the Delta into the Bay.

Contaminants in the Delta water may also reduce the survival of longfin smelt. The effect may be indirect through reduced planktonic food supply or direct from toxin-induced egg, larval, or juvenile stress or mortality.

Other more speculative causes of the decline and low abundance of longfin smelt include competition or predation. Recently established non-native fishes, such as gobies introduced from the ballast water of ships from Asia, compete with longfin smelt. Predation in dry years may also be a problem, although it is difficult to quantify the potential adverse effects. Management programs that should be evaluated for potential adverse influence on longfin smelt and other native fish populations include the juvenile striped bass stocking program and salmon hatchery release programs. The striped bass stocking program has released over 11 million juvenile striped bass from 1985 through 1990 into San Pablo and Suisun Bays and Central Valley salmon hatcheries have released millions of hatchery-reared salmon smolts into San Pablo Bay in spring each year. Changes in plankton abundance and community species composition of the Bay and Delta caused by the introductions of non-native species of zooplankton and Asian clams may also have contributed to the decline of longfin smelt by affecting their food supply.

Overall, the longfin smelt are affected by the following factors in approximate order of importance (U.S. Fish and Wildlife Service 1996);

- reductions in Delta outflows,
- entrainment losses at water diversions,
- climatic variations (droughts and extreme floods),
- toxic substances,
- predation, and
- adverse effects of introduced species.

VISION

The vision for longfin smelt is to recover this California species of special concern and restore population distribution and abundance in the Bay-Delta estuary so that it resumes its historical levels of abundance and its role as an important prey species in the Bay-Delta aquatic foodweb.

Achieving consistently high production of longfin smelt in normal and wetter years, which historically produced more abundant juvenile populations (year classes), will be critical to the recovery of longfin smelt. Good wet-year production would be ensured by (1) not allowing production to fall too low in drier years such that numbers of adult spawners in subsequent wet years remains low, (2) maintaining and improving spawning and rearing habitat, and (3) minimizing stressors in wetter years.

Longfin smelt recovery efforts will also focus on enhancing freshwater outflow in dry and normal water year types during winter spawning and early rearing periods. Natural Delta outflows in dry and below- and above- normal water-year types have been reduced, particularly in late winter and spring, and such reductions coincide with the longfin smelt decline. The 1995 Water Quality Control Plan for the Delta provided interim provisions for increasing February-through-June Delta outflows. Additional improvements in late-winter and spring outflows would:

- improve transport of larvae and juveniles from Delta spawning areas to Bay rearing areas,
- limit the extent of total southerly flows toward the south Delta pumps where larvae and juveniles are subject to being exported,
- improve survival and production of longfin smelt by stimulating foodweb productivity, and
- dilute concentrations of contaminants that may be detrimental to longfin smelt or their food supply.

Although deterioration of habitat is not considered a major factor in the decline of longfin smelt, protecting, improving, and restoring shallow-water habitat in the Bay-Delta would help to increase survival and production of longfin smelt. Increasing shallow water habitat would increase brackish water habitat and overall habitat complexity which may be directly related to longfin smelt survival. Freshwater pushes out most marine larvae and most freshwater species are adapted to avoid being advected downstream by spawning later in the year or in backwater areas.

Other than striped bass and salmonids, few predators exploit pelagic, brackish water habitats, especially when the habitat is shifted downstream geographically between low and high outflow years. Increasing habitat complexity through increasing shallow water habitats (including side channels, etc.) and riparian zone width could assist longfin smelt larval dispersal. Presently, many appear to spawn in main channels and larvae are transported in dense pulses down the main channels and are dispersed into the shallows of Suisun and San Pablo bays. Increasing channel "roughness" may act to retain and spread larval pulses and reduce intra-specific competition.

Improved habitat would provide spawning and rearing habitat and increasing foodweb production. The increased spawning area and improved food supply may help to overcome other factors that have little potential for change (e.g., competition and predation from non-native species). Increases in tidal wetlands will provide tidal channels that are important spawning and rearing habitat. Improving and restoring shallow waters and riparian vegetation along levees and channel islands in the Delta will also provide additional important spawning habitat. Habitat improvements are expected also to increase the abundance of plankton, on which longfin smelt feed, and lead to improved survival of larvae and juveniles.

The Recovery Plan for Native Resident Fishes of the Sacramento-San Joaquin Bay-Delta Estuary (Recovery Plan) recommends restoring spawning and rearing habitat in shallow Delta islands (i.e., Prospect Island, Hastings Tract, Liberty Island, New Hope Tract, Brack Tract, and Terminous Tract) (U.S. Fish and Wildlife Service 1996). The Recovery Plan also recommends restoring tidal shallow-water habitat in Suisun Marsh by reclaiming leveed lands.

In addition to improving Delta outflow and habitats, reducing stressors will be important in restoring longfin smelt populations. Water diversions remove many longfin smelt and their food supply from the Bay and Delta, particularly during drier years. Losses to diversions should be reduced.

SPECIES RESTORATION

The basic strategy for the restoration of longfin smelt is to manage the estuary is such a way that it is a better habitat for native fish in general (U.S. Fish and Wildlife Service 1996). Longfin smelt will be considered restored when its population dynamics and distribution pattern within the estuary are similar to those that existed in the 1967-1984 period. This period was chosen because it includes the earliest continuous data on longfin smelt abundances and was a period during which populations stayed reasonably high in most years.

Distributional and abundance criteria can be met in different years. If abundance and distributional criteria are met for a ten-year period, the species will be considered restored.

INTEGRATION WITH OTHER RESTORATION PROGRAMS

Restoring longfin smelt in the Central Valley is will involve cooperation with the following programs.

- Recovery Plan for the Sacramento/San Joaquin Delta Native Fishes (U.S. Fish and Wildlife Service 1995a): Its purpose under the federal

Endangered Species Act is to provide a strategy for the conservation and restoration of Delta native fishes. Longfin smelt are identified in this plan as requiring prompt restoration actions. The basic objective of this plan is to establish self-sustaining populations of the species of concern, including longfin smelt, that will persist indefinitely. The vision for longfin smelt includes facilitating implementation of the Recovery Plan.

- The Central Valley Project Improvement Act (PL 102-575): It calls for the doubling of the anadromous fish populations (including striped bass, salmon, steelhead, sturgeon, and American shad) by 2002 (U.S. Fish and Wildlife Service 1995b). This program involves actions that may indirectly benefit longfin smelt.
- The Salmon, Steelhead Trout, and Anadromous Fisheries Program Act of 1988: DFG is required under State legislation to restore numbers of anadromous fish in the Central Valley (California Department of Fish and Game 1993). Actions include restoring the food supply of anadromous fish; that food supply includes longfin smelt.

LINKAGE WITH OTHER ECOSYSTEM ELEMENTS

Successful restoration of longfin smelt will be closely tied with improving late winter and spring Delta outflow, increasing shallow water and wetland-slough habitat, reducing the effects of Bay-Delta water diversions, and reducing the level of contaminants in Bay-Delta waters. Restoration actions are similar to those prescribed for other native resident and anadromous fish including delta smelt and striped bass.

OBJECTIVE, TARGETS, ACTIONS, AND MEASURES

> The Strategic Objective is to achieve, first, recovery and then large self-sustaining populations of at-risk species dependent on the Delta, Suisun Bay and Suisun Marsh.

SPECIES TARGET: The recovery goal will be achieved when 1) the fall mid-water trawl surveys in September and October result in the capture of longfin smelt in all zone in 5 out of 10 years, 2) in 2 zones for and additional year, 3) in at least one zone during 3 of the 4 remaining years in the 10 year period with no failure to meet site criteria in consecutive years, and 4) abundance must be equal to or greater that predicted abundance for 5 of the 10 year period.

LONG-TERM OBJECTIVE: Restore longfin smelt abundance to levels that existed in the 1960s and 1970s, as measured over a period of at least 10 years.

SHORT-TERM OBJECTIVE: Achieve the recovery goals for longfin smelt identified in the Delta Native Fishes Recovery Plan.

RATIONALE: The longfin smelt is arguably one of the most endangered fishes in the estuary although the petition for listing it as an endangered species was declined (largely for genetic reasons). Longfin smelt were extremely abundant in the estuary when the fall midwater trawling program began in the 1960s. This period is used as a standard simply because it was during this period that the data available for comparative purposes begin, and the period covers a series of wet and extremely dry years. Evidence suggests that longfin smelt were abundant enough in the 19th century to support a fishery. Because longfin smelt abundance has a strong relationship to X2, future abundance may be tied closely to available fresh water and the ability to manipulate outflows to favor the species. Achieving the long-term objective may be impeded by the presence of several introduced species, notably the clam *Potamocorbula amurensis*. If future investigations determine that substantial reductions in longfin smelt are attributable to the introduced species currently established, then the long-term population abundance objective may need to be scaled back.

STAGE 1 EXPECTATIONS: In 7-10 years, the longfin smelt population indices should stay within the same range that they have been in during the period 1990-1998 unless there is an exceptionally long period of drought. The basic factors limiting their distribution and abundance should be determined.

ADDITIONAL CONSIDERATIONS

The restoration criteria for longfin smelt needs to be reevaluated. The equation used to predict longfin smelt abundance from outflow in the Delta Native Fishes Recovery Plan (U.S. Fish and Wildlife Service

1996) is in error. In addition, the restoration criteria implicitly requires relatively frequent (one of every four years) uncontrolled flows to attain and maintain restoration based on distribution criteria. The required frequency to attain restoration may actually be higher. It may be necessary to concentrate on the lower end of the outflow/abundance relationship and attempt to maintain sufficient outflow for the dominant cohort (i.e., odd year or even year cohort). It might also provide beneficial to consider a January through May period for the increased flow. Based on the dominant cohort, attempt to provide an average February through May outflow of about 12,000 cfs while favoring higher flow of 15,000 or greater in February and possibly in January. If minimum outflows could be provided every other year, sufficient numbers of adults should be present to respond to favorable flow conditions.

RESTORATION ACTIONS

The following general restoration actions would contribute to the recovery of the longfin smelt population:

- Improve Delta outflow in late winter and spring to improve foodweb productivity and to dispense larvae and juvenile longfin smelt to downstream rearing habitat in Suisun and San Pablo Bays.
- Increase the amount of shallow water spawning habitat in the Delta and rearing habitat in Suisun and San Pablo Bays.
- Relocate or add diversion options for the south Delta pumping plants to (1) alleviate net southerly flows in the Delta in drier years, (2) improve transport of young longfin smelt to the Bay and away from the south Delta pumping plants and Delta agriculture diversions, and (3) increase the foodweb productivity.
- Evaluate and implement options to reduce PG&E power plant diversions from January through July in drier years. Options include limiting power operations during critical periods; improving screening facilities to reduce entrainment of larval and early juvenile longfin smelt, life stages that are presently most vulnerable to the intakes; or retrofitting plants with alternative cooling technologies (e.g., cooling towers).
- Evaluate the need to alter the timing and location for stocking striped bass and hatchery-reared chinook salmon in spring and early summer to avoid important longfin smelt juvenile rearing areas in Suisun and San Pablo Bays.
- Develop and implement a program to reduce the introduction of non-native species to the estuary from released ballast water would help minimize increases in predation and competition.
- Develop and implement a program to reduce contaminant inputs to the Bay-Delta would indirectly improve production of longfin smelt.

MSCS CONSERVATION MEASURES

The following conservation measures were included in the Multi-Species Conservation Strategy (2000) to provide additional detail to ERP actions that would help achieve longfin smelt habitat or population targets.

- Coordinate protection, enhancement, and restoration of occupied longfin smelt habitats with other federal, state, and regional programs (e.g., the San Francisco Bay Area Wetlands Ecosystem Goals Project, the Anadromous Fish Restoration Program, and the U.S. Fish and Wildlife Service recovery plans) that could affect management of current and historic habitat use areas to avoid potential conflicts among management objectives and identify opportunities for achieving multiple management objectives.
- Improve January and February flows for the longfin smelt during the second and subsequent years of drought periods.
- Provide sufficient Delta outflows for the longfin smelt during December through March.
- Provide suitable water quality and substrates for egg attachment (submerged tree roots, branches, rock, and emergent vegetation) to spawning areas in the Delta and tributaries of northern Suisun Bay.
- Provide unrestricted access to suitable spawning habitat and protect these areas from physical disturbance (e.g., heavy equipment operation) and flow disruption in the period from December to

July by maintaining adequate flow and suitable water quality to attract migrating adults in the Sacramento and San Joaquin River channels and their tributaries, including Cache and Montezuma sloughs and their tributaries.

- Conduct research to determine the relationship between X2 and longfin smelt abundance and distribution.
- Consistent with CALFED objectives, mobilize organic carbon in the Yolo Bypass to improve food supplies by ensuring flow through the bypass at least every other year.
- Consistent with CALFED objectives, operate diversions to minimize adverse affects of diversions on longfin smelt during the peak spawning period (January - March).
- To the extent consistent with CALFED objectives, protect the Sacramento and San Joaquin river and tributary channels from physical disturbance (e.g., sand and gravel mining, diking, dredging, and levee or bank protection and maintenance) and flow disruption (e.g., water diversion that result in entrainment and in-channel barriers or tidal gates) for the period February 1 to August 31.
- Protect critical rearing habitat from high salinity (>2 ppt) and high concentration of pollutants from the beginning of February to the end of August.

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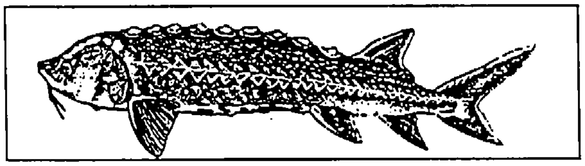
◆ GREEN STURGEON



INTRODUCTION

Green sturgeon rear in the Sacramento-San Joaquin estuary and spawn in the Sacramento and San Joaquin rivers and their major tributaries. Sturgeon may leave the Bay-Delta and move along the coast to as far as Alaska. Populations of green sturgeon are found in many of the larger rivers from California north to British Columbia.

The green sturgeon is designated as a species of special concern by the California Department of Fish and Game (DFG) and U. S. Fish and Wildlife Service (USFWS).

Major factors that limit sturgeon populations in the Bay-Delta are adequate streamflows for attracting adults to spawning areas in rivers and transporting young to nursery areas, illegal and legal harvest, and entrainment into water diversions.

RESOURCE DESCRIPTION

Green sturgeon are native to Central Valley rivers and the Bay-Delta and represent an important component of the historic native fish fauna. Throughout recorded history, white sturgeon have been the dominant sturgeon populations in the Bay-Delta system, whereas in smaller systems such as the Eel River, green sturgeon dominate.

Sturgeon are long-lived species. Change in abundance of older fish may reflect the harvest of adults and habitat conditions that occurred decades ago during the larval and early juvenile life stages.

Green sturgeon inhabit both saltwater and fresh water and tolerate a wide range of salinity concentrations. Habitat requirements of green sturgeon are poorly known, but spawning and larval ecology probably are similar to that of white sturgeon which is better known (U.S. Fish and Wildlife Service 1996). Spawning is thought to occur in larger rivers upstream of the Delta. Low river flow during late winter and spring may reduce attraction of sturgeon to specific rivers and reduce spawning success. Stream channelization and flood control measures on large rivers (e.g., levee construction) may affect sturgeon use and spawning success.

Losses of young sturgeon into water diversions reduces sturgeon productivity. However, relative to other species, the percentage of the sturgeon population caught in diversions is low.

Food availability, toxic substances, and competition and predation are among the factors influencing the abundance of sturgeon. Sturgeon are long lived (e.g., some live over 50 years) and may concentrate pollutants in body tissue from eating contaminated prey over long periods. Harvesting by sport fishers also affects abundance of the adult populations. Illegal harvest (poaching) also reduces the adult population.

VISION

The vision for green sturgeon is to recover this California species of special concern and restore population distribution and abundance to historical levels.

Restoration of this species would contribute to overall species richness and diversity, and reduce conflict between the need for protection for these species and other beneficial uses of water in the Bay-Delta.

Green sturgeon would benefit from improved ecosystem processes, including adequate streamflow to attract adults to spawning habitat, transport larvae and early juveniles to productive rearing habitat, and maintain productivity and suitability of spawning and rearing habitat (including production of food). Ecosystem processes that need improvement include streamflows, stream and channel configurations, and migration barriers (e.g., dams). Additional streamflow during late winter and spring would attract sturgeon to rivers and maintain spawning flow requirements.

Green sturgeon would benefit from restoring spawning and rearing habitat. Habitat restoration may be achieved by adding and modifying physical habitat and increasing freshwater flow during critical periods. Juvenile sturgeon frequent Delta sloughs and may benefit from increases in slough habitat. Spawning habitat includes upstream river reaches that contain appropriate substrate (e.g., gravel, rock). Rearing habitat includes areas in the Sacramento and San Joaquin Rivers and the Delta that provide protective, food-rich habitats such as the shallow shoals and bays of the Bay-Delta.

Reducing stressors is a component of restoring white and green sturgeon populations. Reducing losses to diversions from the Sacramento-San Joaquin Delta estuary would increase survival of young sturgeon. Green sturgeon would also benefit from actions to reduce pollutant input to streams and rivers in the Sacramento-San Joaquin River basin.

SPECIES RESTORATION

The primary restoration objective for green sturgeon is to maintain a minimum population of 1,000 fish over 1 meter total length each year, including 500 females over 1.3 meters total length (minimum size at maturity), during the period (presumably March-July) when spawners are present in the estuary and the Sacramento River (U.S. Fish and Wildlife Service 1996). The restoration of green sturgeon should not be a the expense of other native fishes, including white sturgeon. The 1,000 number was determined as being near the median number of green sturgeon estimated to be in the estuary during the 1980s. The total size of the adult green sturgeon population that uses the estuary may be larger than 1,000 because non-spawning adults may be in the ocean.

Restoration will be measured by determining population sizes from tagging programs or other suitable means. The present sturgeon tagging and recovery program, which focus on white sturgeon, are inadequate for determining accurately the abundance of green sturgeon. Thus, the first restoration criterion will be establishment of an adequate monitoring program so that accurate population estimation can be conducted on a more regular basis.

INTEGRATION WITH OTHER RESTORATION PROGRAMS

Efforts to restore green sturgeon in the Central Valley would involve cooperation and support from other programs underway to restore sturgeon and other important fish.

- The Central Valley Project Improvement Act (CVPIA) (PL 102-575) calls for implementing changes in flows and project facilities and operations by 2002 that lead to doubling of the sturgeon populations.
- The Salmon, Steelhead Trout, and Anadromous Fisheries Program Act of 1988 requires DFG to restore historical numbers of sturgeon in the Central Valley.
- The Four Pumps (SWP) and Tracy (CVP) Fish Agreements provide funds to DFG for sturgeon restoration.
- The Recovery Plan for the Sacramento-San Joaquin Delta Native Fishes (USFWS) identifies recovery actions for green sturgeon.

LINKAGE WITH OTHER ECOSYSTEM ELEMENTS

Restoration of green sturgeon populations are integrally linked with restoration of river floodplain and stream meander habitat, improvements in Central Valley streamflows, improvements in habitat, and reductions in losses to water diversions and illegal harvest.

OBJECTIVE, TARGETS ACTIONS, AND MEASURES

> The Strategic Objective is to achieve, first, recovery and then large self-sustaining populations of at-risk native species dependent on the Delta, Suisun Bay and Suisun Marsh.

SPECIES TARGET: The recovery goal will be achieved when 1) the median population of mature fish (over 1 meter in length) has reached 1,000 fish, including 500 females over 1.3 meters in total length, over a 50 years period or for 5 generations.

LONG-TERM OBJECTIVE: Increase the population of green sturgeon utilizing the Sacramento-San Joaquin estuary and its tributaries so that the recreational fishery benefits.

SHORT-TERM OBJECTIVE: Continue the efforts established under Stage 1 Expectations and implement findings of habitat needs.

RATIONALE: The green sturgeon is relatively uncommon in the Bay-Delta system compared to the white sturgeon and probably always has been. However, the population appears to be one of only three still in existence in North America, so it needs special consideration. Very little is known about the requirements of this species in the system, and the recovery goals identified in the Delta Native Fishes Recovery Plan are based on knowledge gained from their incidental catch in white sturgeon studies and fisheries. Thus, restoration and management of this species requires much better knowledge than currently exists. Because it is so long lived (50+ years) and current exploitation levels seem to be low, there is time to conduct systematic research on its biology to determine the best ways to increase its populations.

STAGE 1 EXPECTATIONS: A better understanding will have been developed about the life history and usage of the Sacramento-San Joaquin estuary and its watershed as spawning and rearing habitats. In addition, a program will have been implemented to monitor the ocean migration and its usage in the life history of the species.

RESTORATION ACTIONS

The following general targets and restoration actions would contribute to the recovery of green sturgeon.

- Restore population to levels of the 1960s,
- Improve flow in Sacramento River in spring,
- Reduce the rate of illegal harvest,
- Reduce the percentage lost of sturgeon to water diversions to that of the 1960s,

The general programmatic actions to assist in the recovery of green sturgeon include:

- Improve the aquatic foodweb,
- Improve spring flows in Sacramento River and major tributaries,
- Restore natural meander belts and add gravel substrates in upstream spawning areas,
- Increase Delta outflow in spring of dry and normal years,
- Improve water quality of Bay-Delta,
- Provide greater enforcement to reduce poaching,
- Reduce losses of eggs, larvae, and juvenile sturgeon at water diversions,
- Upgrade fish protection facilities at diversion facilities in the Delta,
- Restore tidally influenced Delta and estuarine habitat such as tidal perennial aquatic habitat and sloughs.

MSCS CONSERVATION MEASURES

The following conservation measures were included in the Multi-Species Conservation Strategy (2000) to provide additional detail to ERP actions that would help achieve green sturgeon habitat or population targets.

- Coordinate protection, enhancement, and restoration of occupied and historic green sturgeon habitats with other federal, state, and regional programs (e.g., the San Francisco Bay Area Wetlands Ecosystem Goals Project, the Anadromous Fish Restoration Program, the U.S. Fish and Wildlife Service recovery plans, the SB 1086 program, and the Corps' Sacramento and San Joaquin Basin Comprehensive Study) that could affect management of current and historic habitat use areas to avoid potential conflicts among management objectives and identify opportunities for achieving multiple management objectives.
- Provide inflows to the Delta from the Sacramento River greater than 25,000 cfs during the March to May spawning period in at least 2 of every 5 years.
- Identify and implement measures to eliminate stranding of green sturgeon in the Yolo Bypass or to return stranded fish to the Sacramento River.
- Conduct research in the MSCS focus area to determine green sturgeon habitat requirements, distribution, spawning habitat flow

requirements, and factors limiting population abundance.

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